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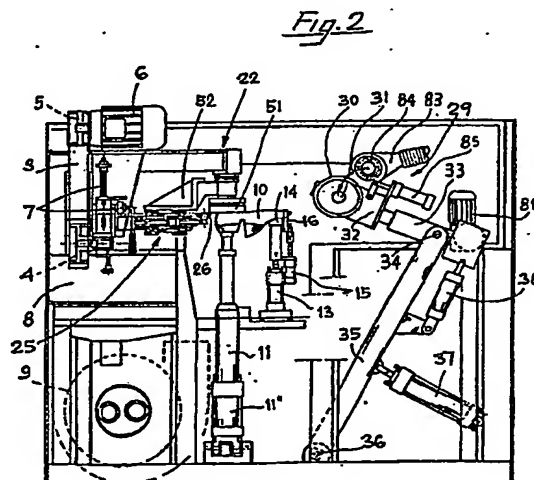
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54 **Machine with various operative functions for the processing of shoes.**

57 Machine with various operative functions for the processing of shoes comprising:
an oscillating column (11) equipped with centering and supporting members (14, 16) of the shoes (10);
a first operating head (2) equipped with rotating abrasive belt (3), suitable for the removal of tufts, precarding and preparation of the shoes (10);
a second operating head (22) for pressing and rear rotating carding, comprising surface carding rollers (24) moved by a motor (23) and a lateral shaped felling roller);
and a third lateral front oscillating operating head (29) for carding and felling, comprising shaped rollers (31, 31', 31'', 31''') moved by a movable motor (30);
said operating heads and said column being mounted on a same supporting structure (1).



MACHINE WITH VARIOUS OPERATIVE FUNCTIONS FOR THE PROCESSING OF SHOES

The present invention concerns a machine with various operative functions for the processing of shoes.

More in particular, the present invention concerns a machine for the processing of shoes comprising various work stations supported by the same structure, each capable of carrying out, semi-automatically or automatically, a specific operation of production of the shoes, like precarding, felling, straightening, glueing in sequential phases and/or in different versions.

There are many shoe processing machines; among them those at present most widely diffused carry out, according to single phases, or in sequential coupling on assembly lines, single operations in semi-automatic or automatic fashion. Said machines, while very efficient and valid from the point of view of the quality of the end product, and that of productivity, have so far been designed for installation on single stations arranged in sequence or in highly automatized assembly lines.

Consequently, said single, independent machines and said assembly lines are unsuitable in particular conditions, e.g. in production cycles with special series of shoes, or in the production of series of shoes with high varieties of models and/or sizes, as they lead to unfunctional, expensive organizing and productive solutions.

The object of the present patent is to solve the above problems.

According to the present invention, this object is obtained by means of a machine with various operative functions for the processing of shoes, comprising:

- a supporting structure with a front part;
- a first operating head for the removal of tufts, precarding and preparation of the shoes;
- a column, movable vertically and horizontally, to move away from or approach the operating head, equipped with centering and supporting means of the shoes;
- a second operating head for the felling and straightening of the heel of the shoes, movable along a circular trajectory with the center at the heel;
- a heating plate coaxial to the column, mounted on said operating head above said column;
- a third operating head for straightening, felling, glueing and carding;
- means to move said third on a vertical plane backwards and forwards with respect to the longitudinal axis of the shoe;
- means to move third head on a vertical plane away from or towards the surface of the plant of the shoe; and

- means to move said third head on a horizontal plane to the right or left of the fixed position of the shoe.

In the machine of the present invention, various motorized operating heads, each suitable to carry out a specific function, are grouped in a same structure.

Said machine is therefore substantially compact and with limited dimensions and is capable of carrying out automatically the most important operations of preparation of the shoes.

The advantages essentially consist in the fact that the machine, in its compactness and limited dimensions and in its versions, is capable of carrying out in sequence the precarding, felling, straightening, carding and glueing operations. Another advantage consists in the fact that the machine, even in its plurality of functions and of mechanical positioning, fixing, moving and centering members, does not require the presence of any operators except for the precarding, loading and discharge phases.

Furthermore, its compact, functional structure permits its installation in any type of room, even of modest dimensions, solving, in particular, also the operative applications of the so-called "island" type.

The present invention can be better understood from the following detailed description in which reference is made to the figures of the enclosed drawings which represent some preferred but unbinding constructive forms, and in which:

fig. 1 shows the schematic view of the cross-section of the machine of the present invention in the carding version;

fig. 2 shows the schematic view of the longitudinal section of the machine of figure 1, in felling + straightening version;

fig. 3 shows the schematic view in plan of the machine of the previous figures in carding version;

fig. 4 shows the schematic view of the longitudinal section of the machine in the previous figures, in carding version;

fig. 5 shows the schematic view in plan of some processing phases with the respective positionings and displacements of the operating carding heads;

fig. 6 shows the lateral schematic view of a carding roller of barrel shape with knurl with double opposite screw;

fig. 7 shows the schematic view of the cross-section of a felling roller;

figs. 8 and 9 show respectively the front and lateral schematic view of the centering and fixing device of the point of the shoe; and

fig. 10 shows the schematic view of the cross-section of the control device of the felling roller of the heel of the machine of the present invention in felling and straightening version.

The figures illustrate a machine with various operative functions for the processing of shoes substantially composed of a structure 1 on which the heads of a plurality of work stations are installed. The first operating head 2 comprises an abrasive belt 3 stretched between a lower idle pulley 4 and an upper pulley 5 moved by a motor 6. The idle pulley 4 is equipped with a stretching means 7 of known type. Below the idle pulley 4 is present a conveyor 8 connected to a motorized exhaust fan 9.

At the height of the conveyor 8, the structure 1 presents an opening from which projects the head 53 of a percussion device 54, preferably of pneumatic type, which can be used by the operator for any finishing hammerings.

The percussion device 54 is positioned inside the structure 1.

The motorized abrasive belt 3 is substantially positioned at the exterior of the structure 1, at its front part (19), at height of man, and can easily be used by the operator for the necessary preliminary operations of removal of the tufts in front and behind, of precarding and at any rate of preparation of the shoes 10, before these are positioned and fixed on a supporting column 11.

Said column 11 comprises some centering and fixing members of the toes of the shoes 10 comprising a piston 13 equipped at the upper free end with supporting plugs 14 and a piston 15 connected to two centering jaws 16, as illustrated in figures 5, 8 and 9.

The plugs 14 comprise also elastic means 17 elastically supporting a roller 14' which accompanies and guides especially the short shoes in the approach phase to said plugs. Said elastic means 17 facilitate and guarantee the adherence of the plugs to the toes of the shoes, regardless of their shape or size.

The centering jaws 16 are connected to the respective control piston 15 by a series of levers arranged with parallelogram 18 which permit the opening and closing movements round the toes of the shoes, according to the return and outward stroke of said piston.

The column 11 is supported at the base to the fulcrum 20, and, to facilitate the loading and discharge operations of the shoes, said column may take up the inclined position 11' towards the front part 19 of the machine, rotating round its fulcrum 20, under the action of a lateral piston 21 (see fig. 1).

In the abovementioned front zone 19 opens a protected window 50 which gives access to the

interior of the structure 1. The operator positioned in this zone 19, after having carried out the specific operations with the abrasive belt 3 of the operating head 2, places the shoe 10, with the relative last, on the connecting pin of the column 11 in inclined position 11', then the column returns to vertical position. Subsequently, the shoe 10 is centered and supported by the abovementioned centering and supporting members 14 and 16. All the abovementioned controls and operating sequences like those which will be described later, may, according to the needs and applications, be with manual, semi-automatic or automatic operation, with possibility of programming.

The column 11 is fixed in the lower part to a pneumatic or hydraulic or oleodynamic piston 11" with vertical axis. A heating plate 51 is fixed to the second operating head 22, above and coaxially to the column 11.

In a first version, when the machine operates as felling and straightening machine, the column 11 is thrust vertically upwards by the lower piston 11" until it brings the heel zone of the upturned shoe 10 into contact with a heat-plate 51.

The force of contact between plate 51 and shoe 10 is adjustable according to the product to be treated and to the squashing and straightening needs of said heel zone.

The machine in the felling and straightening version comprises a second operating head 22 composed of a percussion unit 25 (see fig. 10), preferably but unbindingly of pneumatic type, equipped with felling roller 26, shaped to adhere and beat uniformly and regularly along the crown of the heel of the shoes 10.

The operating head 22 is fixed, in position substantially oriented in horizontal direction, to a carriage 52 which can make a horizontal arc movement 27, whose center corresponds to the position 28 taken up by the heel of the shoe 10. The center 28 is therefore aligned with the vertical axis of the column 11.

During the movement of circular traverse round the arc 27 of the carriage 52, the shaped roller 26, of substantially conical conformation, presses and strikes the leather of the heel of the shoe along the crown of the heel to make it perfectly adherent to the last.

The driving head 22 rotates in synchronism with the third operating head 29. It comprises (see figs. 2 and 3) a motor 30 supporting the rollers 31, mounted on an adjustable support 32 applied to a crosspiece 33. Said crosspiece is, in turn, mounted in swinging manner round a fulcrum 34 positioned at the upper end of a vertical support 35 fixed at the base to the pin 36 and swinging round said fulcrum 36, by means of the action of a rear transversal piston 37.

The vertical oscillation of the vertical support 35 is oriented with respect to the longitudinal axis of the shoe 10; it therefore permits a forward and backward travel from same. The swinging vertical movement of the crosspiece round the fulcrum 34 is produced by a rear piston 38 and permits lower- or lifting of the motor 30, bringing the roller 31 towards or away from the surface of the plant of the shoe 10. The adjustable support 32, finally, is driven by a lateral piston 39 and makes it possible to rotate the motor 30, with relative roller 31, in a horizontal plane, to the right or left of the fixed position of the shoe in processing.

Through said movements: vertical forward or backward produced by the rear transversal piston 37; vertical upwards or downwards produced by the rear piston 38, and horizontal to the right or left produced by the lateral piston 39, it is possible to carry out the necessary processings of felling and straightening, on the entire lower surface of the shoes 10 in processing, regardless of their last; for men, for women, conformed for applications of low or high heels, for children, and of their size. In particular, to the oscillation to the right and left of the motor 30, and therefore of the roller 31, permits the perfect processing of straightening of the two lateral edges of the shoes, both during the outward and return stroke of the vertical support 35. The amplitudes of the various strokes of oscillation are regulated by limit switches 80 whose micrometric regulation of the amplitude of displacement is obtained by means of a motor reducer 81 through a right-left threaded bar 82.

In the carding version, the drive head 22 may be exchanged with a drive head 22' comprising a motor 23 supporting a carding roller 24 and fixed to the abovementioned movable carriage (52).

Said carding roller (24) operates on a horizontal plane corresponding to that of the heel of the shoes (10).

In this case, the column 11 comprises a piston device (12) of known type, suitable to fix the last of the shoe 10, while the same centering and fixing members 14 and 16 act on the front part. The same third operating head 29 with motor 30 is used in the carding version, using in this case suitable carding rollers 31'. The felling, straightening and carding operations are carried out using, respectively, rollers 31' and 31'' with different characteristics.

In particular, besides the rollers of traditional type known for straightening and carding, with concave surfaces towards the center and with opposite spirals of rigid type and of soft type with inserts of metal bristles, rollers 31' and 31'' with some particularities which improve their performances are used.

The straightening felling rollers 31' are prefer-

ably barrel-shaped and present the surface furrowed by opposite double smooth screws, which, however, do not develop long spirals of circumferential development, but long polygonal developments. In substance, the peripheral surface of the rollers 31' presents a quantity of flat smooth transversal strips 41, alternated to curved smooth strips 42.

The quantity of said flat strips may vary according to straightening needs. During rotation of the roller 31', produced by the motor 30, the curved surfaces 42 and flat surfaces 41 alternate in the pressure-contact on the surface of the shoes 10 and their difference causes a striking action which carries out a perfect action of straightening.

Similar flat surfaces 41 are obtainable also on the rollers 31'' with concave conformation towards the center and at any rate on any other type of roller, possibly cylindrical, conical or similar.

The carding rollers 31'', also substantially and preferably present a barrel shape, with surface covered by double opposite screws 43, knurled, inserted with double opposite smooth screws 40. Similarly, the same double spiral conformation may be used also on carding rollers 31'' with concave surfaces towards the center. At any rate, for the carding of the shoes which can be carried out with the operating head 29, traditional rollers with abrasive or cutting surfaces can also be used. The same abovementioned characteristics, present on the rollers of the motor 30 are also present on the rollers 24 of the motor 23, for rear rotating carding.

For any glueing phase it is sufficient to substitute the straightening roller 31' or carding roller 31'' with a special glueing roller, of traditional type, equipped with a glue tray. A cleaning/suction device 83, comprising an idle rotating brush 84, is fixed on the support 32 and has the function of cleaning periodically both the felling roller 31' and the carding roller 31''. The forward and backward movement of the brush 84 from the roller 31' or 31'' to be cleaned, is carried out by a piston 85, which acts on said device 83, making it rotate round the fulcrum.

Claims

1. Machine with various operative functions for the processing of shoes comprising:

- a supporting structure (1) with a front part (19);
- a first operating head (2) for the removal of tufts, precarding and preparation of the shoes;
- a column (11) movable vertically and horizontally to move the operating head (2) backwards and forwards, equipped with centering and supporting means (14,16) of the shoes;
- a second operating head (22) for the felling and

straightening of the heel of the shoe, movable along a circular trajectory (27) having the center (28) at the heel;

- a heating plate (51) coaxial to the column (11) and mounted on said operating head above said column;

- a third operating head (29) for straightening, felling, glueing and carding;

- means (37) to move said third head (29) on a vertical plane backwards and forwards with respect to the longitudinal axis of the shoe;

- means (38) to move said third head (29) on a vertical plane towards or away from the surface of the plant of the shoe; and

- means (39) to move said third head (29) on a horizontal plane to the right or left of the fixed position of the shoe.

2. Machine according to claim 1, characterized by the fact that the first operating head (2) comprises an abrasive belt (3) stretched between a lower idle pulley (4), equipped with stretching means (7), and an upper pulley (5) driven by a motor (6).

3. Machine according to claims 1 and 2, characterized by the fact that the first operating head (2) is equipped with a conveyor (8) with motorized suction fan (9).

4. Machine according to any of the previous claims, characterized by the fact that the first operating head (2) is positioned substantially on the exterior of the structure (1) at its front part (19).

5. Machine according to any of the previous claims, characterized by the fact of comprising a percussion device (54), with hammering head (53) projecting from the structure (1), near the first operating head (2).

6. Machine according to any of the previous claims, characterized by the fact that the column (11) is hinged to a base fulcrum (20) and is equipped with a lateral piston (21) to move it away from and towards the first operating head (2) and with a lower piston (11') with vertical axis for its vertical movement.

7. Machine according to any of the previous claims, characterized by the fact that the supporting means of the toes of the shoes (10) comprise a control piston (13) equipped with a supporting plug (14) equipped with elastic device (17) with accompanying roller (14') of regulation and adherence of the shoes, and that the centering means of the toes comprise a piston (15) which is connected to lateral centering jaws (16) by a series of parallelogram levers (18).

8. Machine according to any of the previous claims, characterized by the fact that the second operating head (22) of felling and rotating straightening comprises a percussion unit (25), preferably pneumatic, equipped with shaped felling roller (26),

preferably with conic conformation and mounted on a carriage (52) equipped with horizontal arc movement (27), whose center (28) corresponds to the heel of the shoe (10) which is coaxial to the column (11).

9. Machine according to any of the previous claims, characterized by the fact that the second operating head (22) is interchangeable with a drive head (22') of carding fixed to the movable carriage (52) and comprising a motor (23) supporting a carding roller (24) operating on a horizontal plane corresponding to that of the heel of the shoes (10).

10. Machine according to any of the previous claims, characterized by the fact that the third operating pressing head (29) comprises an oscillating vertical support (35) fixed to the base (36), a swinging crosspiece (33), hinged to said support, an adjustable support (32) applied to said support (32).

11. Machine according to claim 10, characterized by the fact that the vertical support (35) is equipped with a piston (37) for its forward and backward movement with respect to the longitudinal axis of the shoe; the cross-piece (33) is equipped with a piston (38) to move it towards or away from the surface of the plant of the shoe; and the adjustable support (32) is equipped with a piston (39) for its lateral movement in both directions; the amplitudes of these movements are regulated by means of limit switches (89) through a motor reducer (81) and a right-left threaded bar (82).

12. Machine according to any of the previous claims, characterized by the fact that the roller (31", 31') of the third operating head (29) has external barrel shape, possibly with surface concave towards the center, with the surface furrowed by double smooth opposite screws (40) inserted with double knurled opposite spirals (43).

13. Machine according to any of the previous claims from 1 to 11, characterized by the fact that the roller (31") has external barrel shape with the surface furrowed by double opposite screws which develop along polygonal spirals, formed by flat smooth strips (41) alternated to curved smooth strips (42).

14. Machine according to any of the previous claims, characterized by the fact that the third operating head (29) comprises also a suction device (83), comprising a rotating brush (84), fixed on the adjustable support (32) and driven by a piston (85).

15. Machine according to any of the previous claims, characterized by the fact that the motor (30) of the third operating head (29) supports a glueing roller equipped with glue tray.

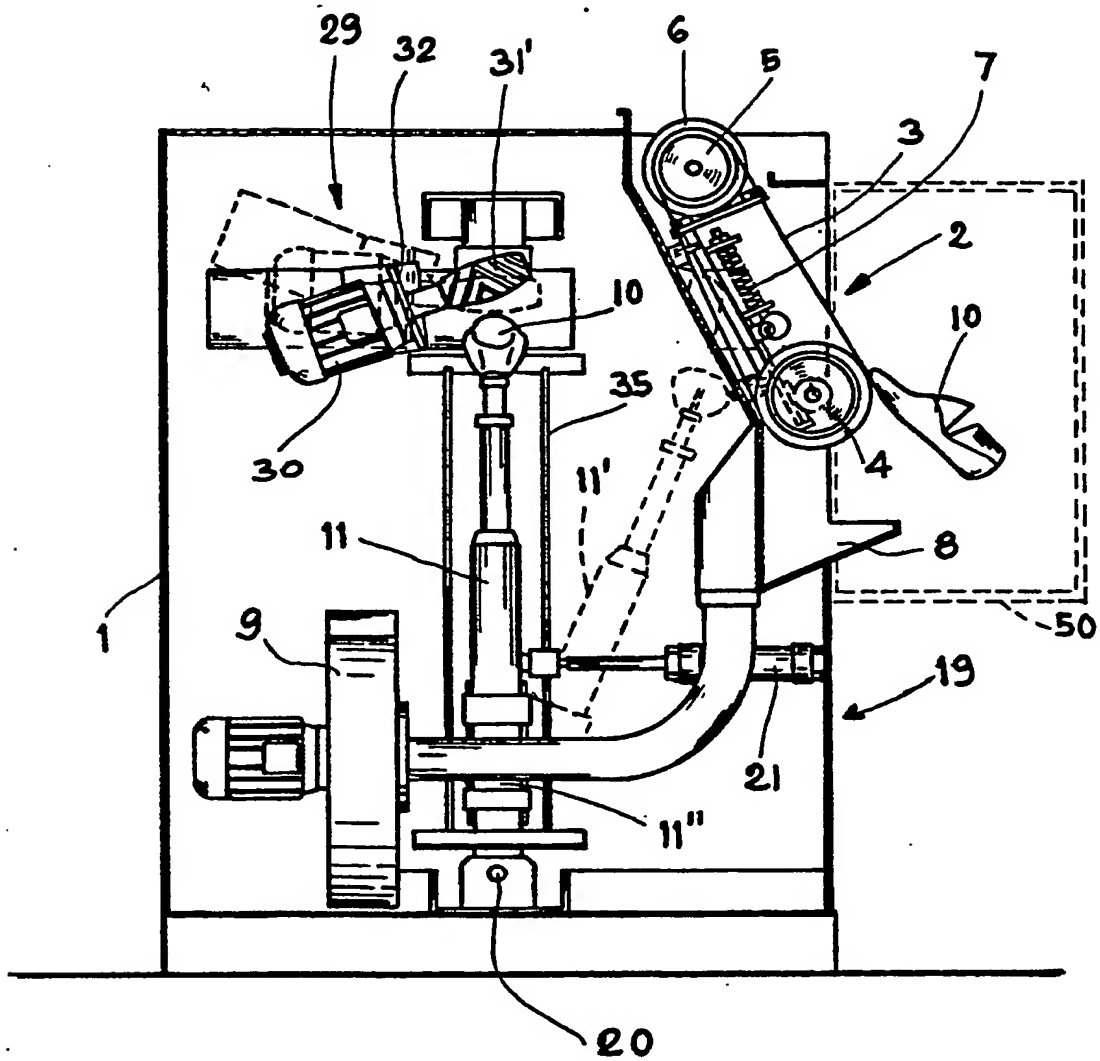
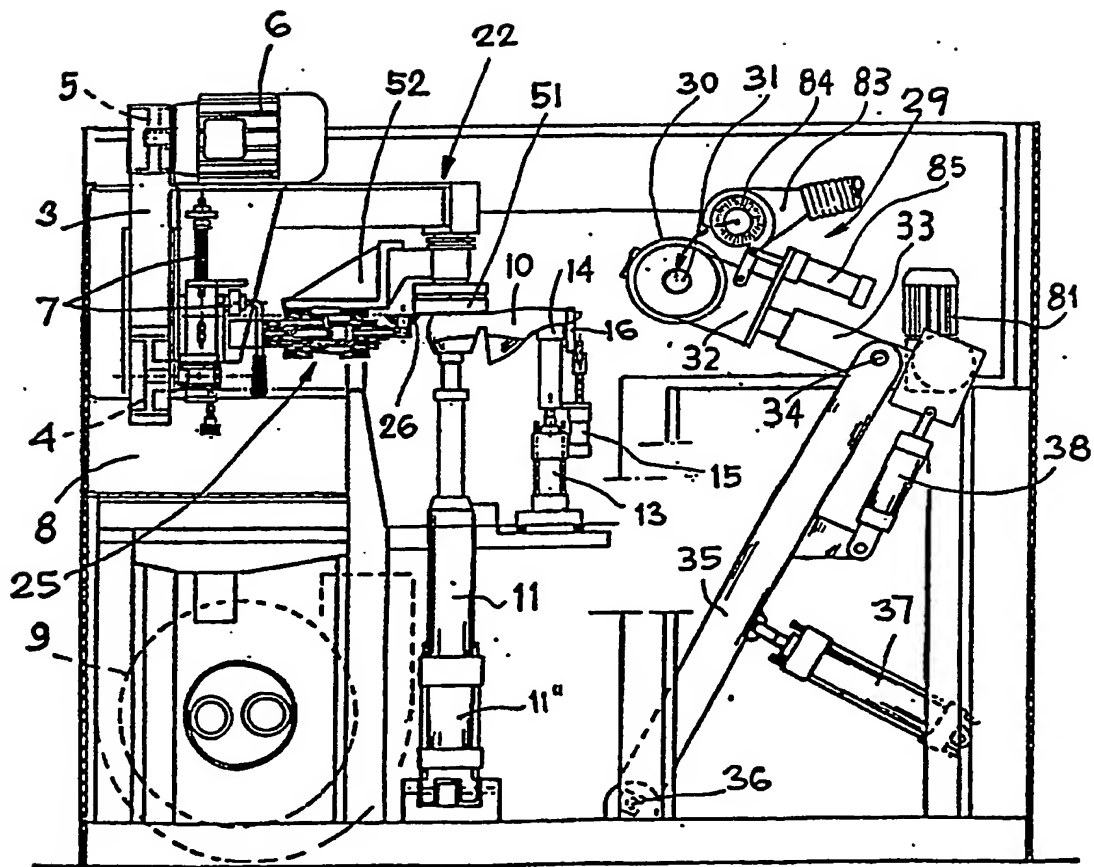
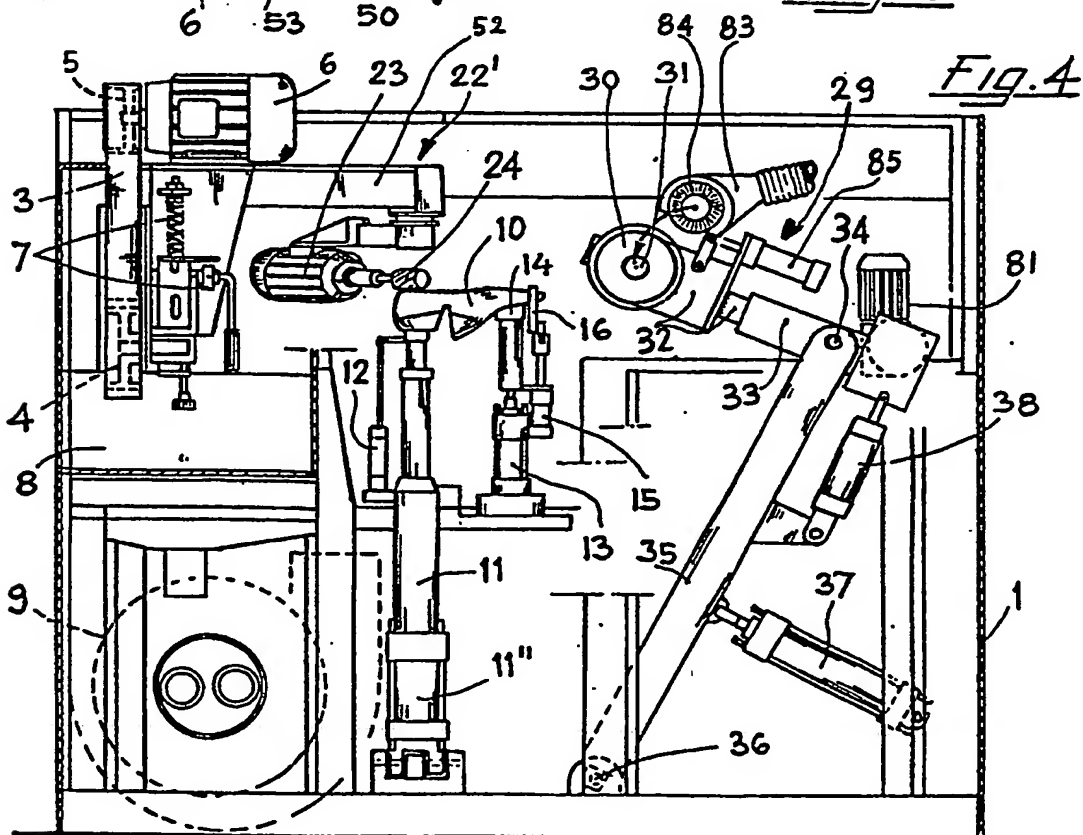
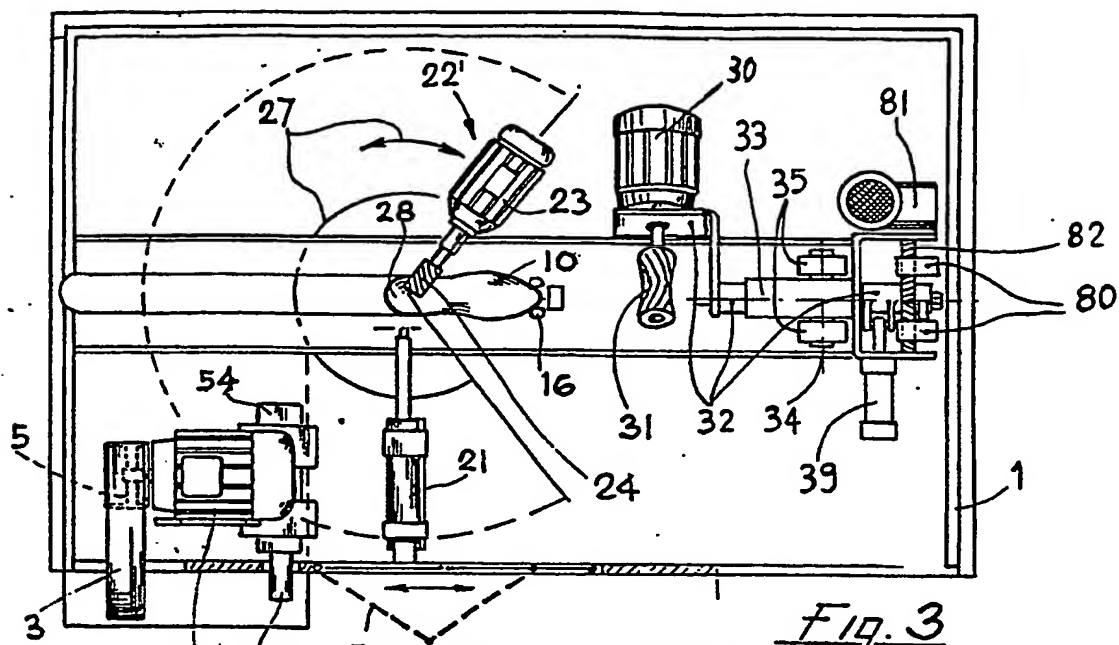


Fig. 1

Fig. 2





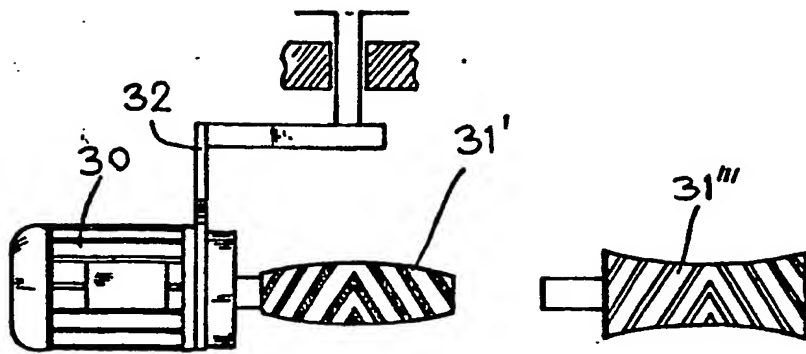


Fig. 5

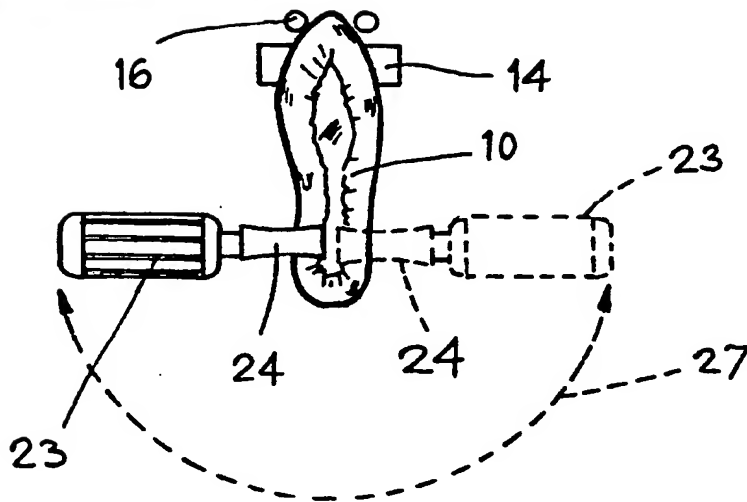


Fig. 6

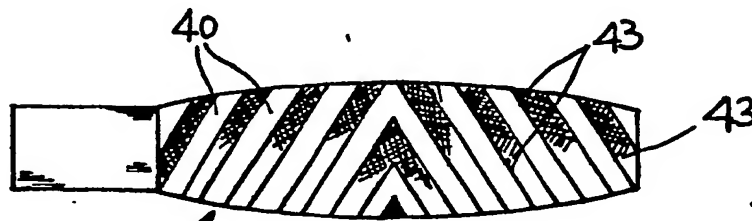
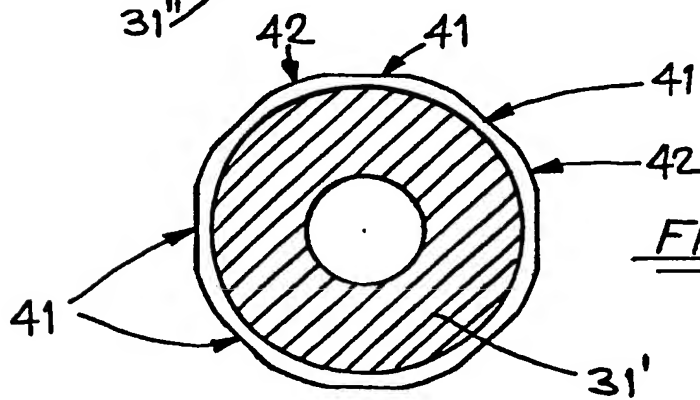


Fig. 7



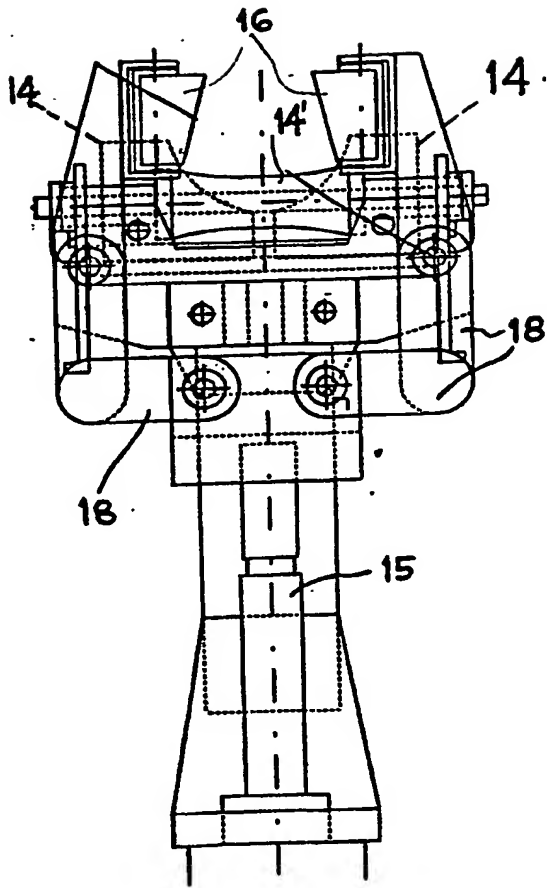


Fig. 8

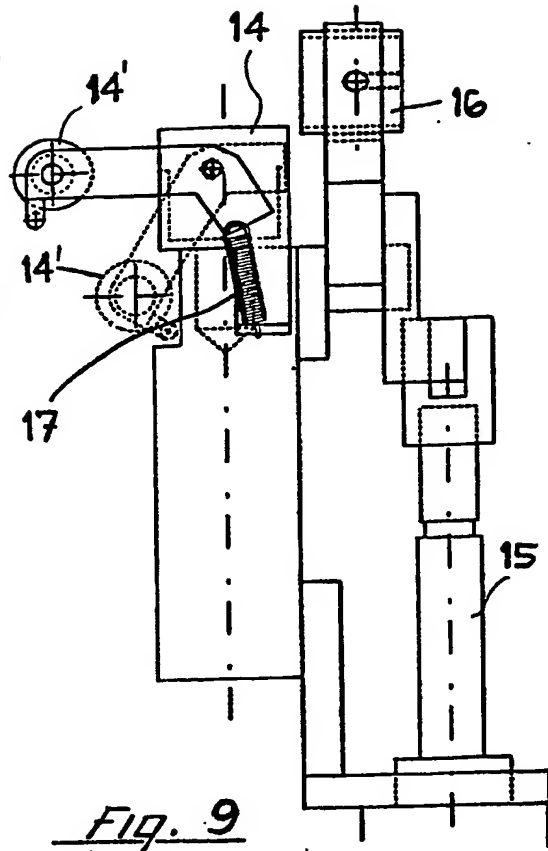


Fig. 9

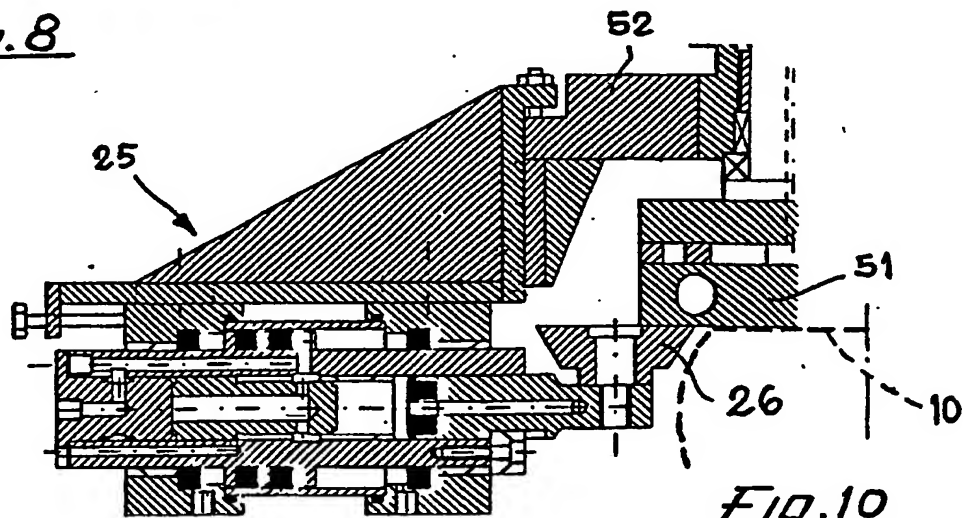


Fig. 10